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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/823,372

03/30/2001

John E. Dolan

KLR 7146.109

7358

55648

7590

08/30/2006

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EXAMINER

THOMPSON, JAMES A

ART UNIT

PAPER NUMBER

2625

DATE MAILED: 08/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/823,372

Applicant(s)

DOLAN ET AL.

Examiner

James A. Thompson

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-15, 17, 18, 20-28, 34 and 40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Response to Arguments***

1. Applicant's arguments, see page 6, lines 3-5, filed 23 June 2006, with respect to the rejections under 35 USC §112, 2<sup>nd</sup> paragraph have been fully considered and are persuasive. The rejections under 35 USC §112, 2<sup>nd</sup> paragraph listed in items 3-4 of the previous office action, dated 10 March 2006 and mailed 17 March 2006, have been withdrawn.

2. Applicant's arguments filed 23 June 2006 have been fully considered but they are not persuasive.

**Regarding page 6, line 6 to page 7, line 3:** Firstly, the "variable luminance threshold value automatically calculated" and the "detection of shadows cast by said object" are features introduced by the present amendments to claim 40, and were not previously recited in claim 40. Furthermore, as set forth in detail below, Ichihara (US Patent 5,198,853) does teach the presently amended feature of "detection of shadows cast by said object" (column 6, lines 56-61 and column 7, lines 64-68 of Ichihara) and Feng (US Patent 6,046,828) teaches the "variable luminance threshold value automatically calculated" (figures 3-6; column 5, lines 19-28; and column 6, lines 48-57 of Feng). Though the same prior art references are applied, new grounds of rejection are necessitated by the present amendments to the claims.

**Regarding page 7, line 4 to page 9, line 2:** Feng does indeed automatically calculate a variable luminance threshold using one or more statistical measures (figures 3-6; column 5, lines 19-28; and column 6, lines 48-57 of Feng). Mean and

Art Unit: 2625

standard deviation values are used to determine the edges and width of the document to be scanned (column 5, lines 19-28 of Feng). The peaks of a histogram, which is another statistical measure, is used to automatically calculate a threshold value used to determine whether the document covers the ends of the scanner (column 6, lines 48-57 of Feng). Claim 40 is fully taught by *the combination* of Ichihara and Feng, as clearly set forth in detail below. Applicant is respectfully reminded that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

**Regarding page 9, lines 3-8:** The threshold value is based on the peak values of the histograms, which are based on whether or not the document covers the ends of the scanner (column 6, lines 52-56 of Feng). Thus, the threshold value varies with the size of the image since the threshold value is different if the document covers the scanner than if the document does not cover the scanner.

**Regarding page 9, lines 8-17:** Firstly, the portion of Kowalski (US Patent 5,778,104) cited refers to *luminance* value and not color values. While Kowalski may perform filtering for a color image, it is the luminance values which are used in the computations. Secondly, the teachings of Kowalski are with respect to the degree of change in luminance values, which clearly relates to the teachings of Ichihara and Feng. While Kowalski may apply the concepts cited in terms of a filter, the same concepts can be applied to document edge detection since document edge detection is also a form of filtering. Finally, it is the *combination* of references which fully teaches claims

Art Unit: 2625

26 and 27. As stated above, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-3, 12, 14-15, 17-18, 20-21, 24-25, 28, 34 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihara (US Patent 5,198,853) in view of Feng (US Patent 6,046,828).

Regarding claim 40: Ichihara discloses an imaging system (figures 1-4 and column 4, lines 45-55 of Ichihara) comprising:

- an image sensor (figure 1(4) and column 5, lines 58-63 of Ichihara).
- a backing (figure 2(2) of Ichihara) having a surface opposed to said sensor (as clearly shown in figure 2 and column 5, lines 49-53 of Ichihara).
- an image processor (figure 4(35) and column 7, lines 44-48 of Ichihara) having a plurality of stat buffers (figure 4 (23a,28,30,33,34); and column 7, lines 6-9 and lines 44-48 of Ichihara) and that analyzes candidate edges for bounding

Art Unit: 2625

regions (figure 3B and column 6, lines 56-61 of Ichihara) and identifies shadows cast by an object adjacent said backing as edges of a bounding region (column 6, lines 56-61 and column 17, lines 56-61 of Ichihara) based, at least in part, on:

- o a variable luminance threshold value (column 7, lines 48-51 and column 9, lines 11-18 of Ichihara) compared with one or more statistical measures (figure 6-A; figure 6-B; and column 7, lines 58-64 of Ichihara) and that causes detection of shadows cast by said object on said backing (column 6, lines 56-61 and column 7, lines 64-68 of Ichihara); and
- o the presence of detected said shadow in a contiguous plurality of stat buffers (figure 7(F-6 to F-12); figure 8(P-5 to P-8); and column 9, lines 48-62 of Ichihara).

Ichihara does not disclose expressly that said variable luminance threshold is automatically calculated using said one or more statistical measures.

Feng discloses automatically calculating a variable luminance threshold using one or more statistical measures (figures 3-6; column 5, lines 19-28; and column 6, lines 48-57 of Feng).

Ichihara and Feng are combinable because they are from the same field of endeavor, namely the detection of document edges in a document image scanning system. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the one or more statistical measures taught by Ichihara to automatically calculate the variable luminance threshold, as taught by Feng. The suggestion for doing so would have been that the measurements for determining the edges of a

Art Unit: 2625

scanned document are statistical in nature (column 7, lines 58-64 of Ichihara; and column 5, lines 19-18 of Feng). A further suggestion for doing so would have been that the determination of boundary edges is based on the relative values of the threshold and the statistical calculations derived from edge candidate pixels (figure 7(F-6,F-10); figure 8(P-5); and column 9, lines 11-18 of Ichihara). Therefore, it would have been obvious to combine Feng with Ichihara to obtain the invention as specified in claim 40.

**Regarding claim 2:** Ichihara discloses that the scanned object is essentially flat (figure 2(G) and column 6, lines 33-40 of Ichihara). The document to be scanned (figure 2(G) and column 6, lines 33-40 of Ichihara) is clearly flat.

**Regarding claim 3:** Ichihara discloses that said backing is a cover (column 5, lines 49-53 of Ichihara) and is substantially flat (as can clearly be seen in figure 2 of Ichihara) and is in a face-to-face relationship with said object (figure 2 and column 6, lines 37-40 of Ichihara).

**Regarding claim 12:** Ichihara discloses that said imaging system increases the difference (variation ratio) of luminance values in the range of likely document edge values (column 8, lines 58-68 of Ichihara).

**Regarding claim 14:** Ichihara discloses that an image obtained from sensing said object has a plurality of horizontal rows of pixels vertically aligned with respect to each other (figure 5 and column 8, lines 19-23 of Ichihara), and said imaging system groups said horizontal rows of pixels into a plurality of vertically contiguous groups (column 8, lines 62-67 of Ichihara), and said imaging system computes a statistical measure in a direction transverse to said horizontal row of

Art Unit: 2625

pixels (column 8, line 67 to column 9, line 5 of Ichihara), using said statistical measure when detecting said boundary region (figure 6-A; figure 7; and column 7, lines 58-68 of Ichihara).

**Regarding claim 15:** Ichihara discloses that an image obtained from sensing said object has a plurality of vertical columns of pixels horizontally aligned with respect to each other (figure 5 and column 8, lines 24-28 of Ichihara), and said imaging system groups said vertical columns of pixels into a plurality of horizontally contiguous groups (column 9, lines 41-49 of Ichihara), and said imaging system computes a statistical measure in a direction transverse to said vertical column of pixels (column 9, lines 46-54 of Ichihara), using said statistical measure when detecting said boundary region (figure 6-B; figure 8; and column 9, lines 53-62 of Ichihara).

**Regarding claims 17 and 18:** Ichihara discloses that said imaging system detects edges using said statistical measure (column 7, lines 64-68 and column 8, lines 10-14 of Ichihara).

**Regarding claim 20:** Ichihara discloses that a set of statistical measures in a direction transverse to said horizontal row of pixels from a plurality of said groups are statistically processed for detecting said boundary region (figure 6-A and column 7, lines 59-68 of Ichihara).

**Regarding claim 21:** Ichihara discloses that a set of statistical measure in a direction transverse to said vertical column of pixels from a plurality of said groups are statistically processed for detected a said boundary region (figure 6-B and column 8, lines 1-14 of Ichihara).



Art Unit: 2625

**Further regarding claim 24:** Feng discloses that said threshold value varies with the size of the object being images (column 6, lines 52-56 of Feng).

**Regarding claim 25:** Ichihara discloses that said imaging system determines said at least one boundary of said object based upon a variable (column 10, lines 63-68 of Ichihara) said threshold value (column 9, lines 11-18 and lines 48-53 of Ichihara).

Ichihara does not disclose expressly that said threshold value is calculated using said statistical measures.

Feng discloses calculating a variable luminance threshold using statistical measures (figure 3-6; column 5, lines 19-28; and column 6, lines 48-57 of Feng).

Ichihara and Feng are combinable because they are from the same field of endeavor, namely the detection of document edges in a document image scanning system. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the statistical measures taught by Ichihara to set the variable luminance threshold, as taught by Feng. The suggestion for doing so would have been that the measurements for determining the edges of a scanned document are statistical in nature (column 7, lines 58-64 of Ichihara; and column 5, lines 19-18 of Feng). A further suggestion for doing so would have been that the determination of boundary edges is based on the relative values of the threshold and the statistical calculations derived from edge candidate pixels (figure 7(F-6,F-10); figure 8(P-5); and column 9, lines 11-18 of Ichihara). Therefore, it would have been obvious to combine Feng with Ichihara to obtain the invention as specified in claim 25.

**Regarding claim 28:** Ichihara discloses that an image obtained from sensing said object has a plurality of horizontal rows of pixels (figure 5 and column 8, lines 19-23 of Ichihara).

**Regarding claim 34:** Ichihara discloses that an image obtained from sensing said object has a plurality of vertical columns of pixels (figure 5 and column 8, lines 24-28 of Ichihara).

5. Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihara (US Patent 5,198,853) in view of Feng (US Patent 6,046,828) and Yamanishi (US Patent 5,696,595).

**Regarding claim 4:** Ichihara discloses that the edges of a document are determined based on the shadows cast on the cover (figure 2(2) and column 17, lines 56-61 of Ichihara) and that soil and toner, which would cause inconsistencies in the coloration of the cover, worsens the detectability of document edges (column 10, lines 44-50 of Ichihara). Thus, it would be reasonable to infer that said cover has a background color that covers a major portion of said cover. However, Ichihara in view of Feng does not expressly disclose said cover has a background color that covers a major portion of said cover.

Yamanishi discloses a background color (white) that covers a major portion of a scanner cover (column 10, lines 53-55 of Yamanishi). Since the scanner cover is white (column 10, lines 53-55 of Yamanishi), then clearly the background color (white) covers a major portion of said scanner cover.

Ichihara in view of Feng is combinable with Yamanishi because they are from the same field of endeavor, namely scanning and processing digital image and document data. At the time of the invention, it would have been obvious to a person of

Art Unit: 2625

ordinary skill in the art to specifically use a cover which has a background color that covers a major portion of said cover, as taught by Yamanishi. The suggestion for doing so would have been that inconsistencies in the coloration of the cover worsens the detectability of document edges (column 10, lines 44-50 of Ichihara). Thus, one of ordinary skill in the art at the time of the invention would naturally use a background color for the cover that covers a major portion of said cover. Therefore, it would have been obvious to combine Yamanishi with Ichihara in view of Feng to obtain the invention as specified in claim 4.

**Regarding claim 5:** Ichihara discloses that said imaging system is capable of determining a plurality of boundaries of said object (figure 5; column 7, lines 64-68; and column 8, lines 7-14 of Ichihara).

**Regarding claim 6:** Ichihara discloses that said imaging system is capable of determining four boundaries of said object (figure 5; column 7, lines 64-68; and column 8, lines 7-14 of Ichihara).

**Regarding claim 7:** Ichihara discloses that said imaging system has a flat surface supporting said object (figure 2(1) and column 5, lines 49-51 of Ichihara).

**Regarding claim 8:** Ichihara discloses that said object is paper (figure 2(G); figure 3-B(A3,A4,B5); and column 5, lines 49-51 of Ichihara). The object (figure 2(G) of Ichihara) that is scanned is a document (column 5, lines 49-51 of Ichihara). Furthermore, the scanner is clearly set for scanning standard paper sizes (figure 3-B(A3,A4,B5) of Ichihara). Therefore, said object is clearly paper.

Art Unit: 2625

6. Claims 9-11, 13, 22-23 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihara (US Patent 5,198,853) in view of Feng (US Patent 6,046,828) and Kowalski (US Patent 5,778,104).

Regarding claims 9 and 13: Ichihara in view of Feng does not disclose expressly that said imaging system converts a first color space of an image obtained from sensing said object to a second color space where the luminance of said image is enhanced over the first color space.

Kowalski discloses converting a first color space of an image obtained from sensing said object (column 3, lines 53-59 of Kowalski) to a second color space (column 3, lines 66-67 of Kowalski), where the luminance of said image is enhanced over the first color space (column 4, lines 2-11 of Kowalski). Computing the luminance values by using different coefficients, and therefore different proportions, of the color components (column 4, lines 2-11 of Kowalski) enhances the luminance values of the first color space.

Ichihara in view of Feng is combinable with Kowalski because they are from the same field of endeavor, namely digital image data scanning and processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to convert a color document into enhanced luminance values, as taught by Kowalski, in order to detect the boundaries using the imaging system taught by Ichihara. The suggestion for doing so would have been that the imaging system of Ichihara operates based on the difference in luminance values of the image, which are used to detect the shadows (column 8, lines 58-68 of Ichihara). Therefore, if a color image is to be processed, the color component values need to be converted into lumin-

ance values for processing. Therefore, it would have been obvious to combine Kowalski with Ichihara in view of Feng to obtain the invention as specified in claims 9 and 13.

**Further regarding claim 10:** Kowalski discloses that said first color space includes a plurality of dimensions (column 3, lines 46-51 of Kowalski) and said second color space includes fewer dimensions than said first color space (column 4, lines 4-11 of Kowalski). There are three color components, such as RGB, in said first color space (column 3, lines 46-51 of Kowalski) and only one color component (luminance) in said second color space (column 4, lines 4-11 of Kowalski).

**Further regarding claim 11:** Kowalski discloses that said first color space is red, green and blue (column 3, lines 51-52 of Kowalski), and said second color space is luminance (column 4, lines 4-11 of Kowalski).

**Regarding claims 22 and 23:** Ichihara in view of Feng does not disclose expressly that the statistical processing said statistical measures emphasizes spatial regions of increased statistical measure.

Kowalski discloses further processing spatial regions of increased statistical measure to emphasize said regions (column 4, lines 37-39 and lines 56-61 of Kowalski). Filter values are determined for a neighborhood of pixels (column 4, lines 37-39 of Kowalski) based on the statistical measure of said neighborhood (column 4, lines 56-61 of Kowalski).

Ichihara in view of Feng is combinable with Kowalski because they are from the same field of endeavor, namely digital image data scanning and processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to filter the image data based on the variation between

Art Unit: 2625

the minimum and maximum luminance values of a group, as taught by Kowalski. Therefore, in the system taught by Ichihara in view of Feng, the variation of the luminance values would determine how much emphasis a group would receive, depending on whether or not there is an edge. The motivation for doing so would have been to improve the quality of an image which comprise a combination of features (column 3, lines 2-7 of Kowalski). Therefore, it would have been obvious to combine Kowalski with Ichihara in view of Feng to obtain the invention as specified in claims 22 and 23.

**Regarding claims 26 and 27:** Ichihara in view of Feng does not disclose expressly that said variable threshold value is calculated based upon a percentage of the maximum observed statistical measure.

Kowalski discloses calculating the variable filter values of the neighborhood of pixels based upon a percentage of the maximum observed statistical measure (column 4, lines 56-61 of Kowalski). The percentage difference between the maximum and minimum luminance values of the neighborhood of pixels determines the filter value since  $L_{min}$  changes linearly from  $1/9$  to 1 as said difference increases (column 4, lines 56-61 of Kowalski). In other words, as percentage difference between  $L_{min}$  and  $L_{max}$  increases, the variable filter values increase.

Ichihara in view of Feng is combinable with Kowalski because they are from the same field of endeavor, namely digital image data scanning and processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to set the variable threshold taught by Ichihara in view of Feng based on the percentage of the statistical measures, as taught by Kowalski. The motivation for doing so would have been

to improve the quality of an image which comprise a combination of features (column 3, lines 2-7 of Kowalski), and would therefore require a variable threshold. Therefore, it would have been obvious to combine Kowalski with Ichihara in view of Feng to obtain the invention as specified in claims 26 and 27.

### ***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be

Art Unit: 2625

reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



23 August 2006

James A. Thompson  
Examiner  
Technology Division 2625



**DAVID MOORE**  
**SUPERVISORY PATENT EXAMINER**  
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